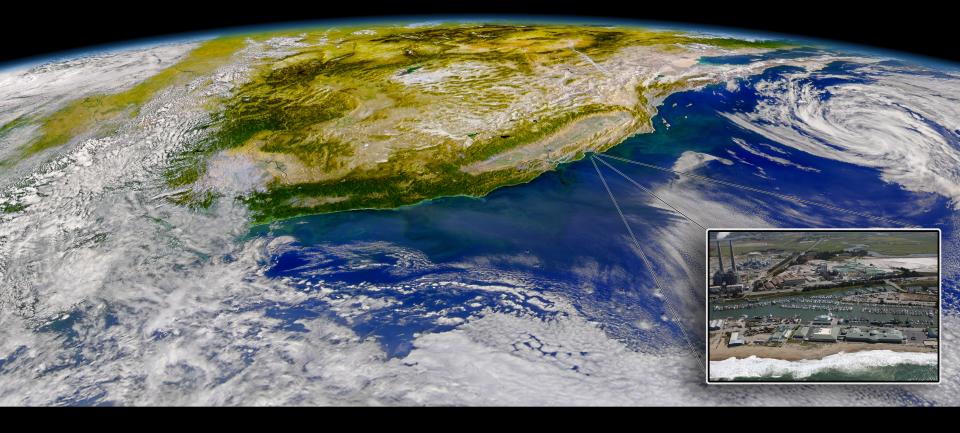
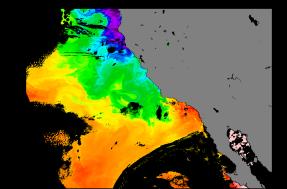
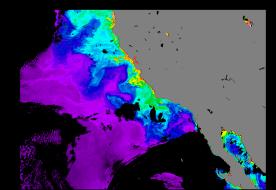
NASA Satellite Data for Marine Resource Management Moss Landing 2006 Norman Kuring – NASA / GSFC









Overview

- What is the NASA Ocean Biology Processing Group (OBPG)?
- What do we offer Data Products
- How do you get the products?
- How to work with the data

Ocean Biology Processing Group (OBPG)

- Originated as SeaWiFS Project
 - CZCS processing
- February 2004 assumed responsibility for Aqua MODIS ocean color products
- March 2006 assumed responsibility for Aqua MODIS SST products.

Current Capabilities

Fully automated, distributed data system for acquiring, processing, analyzing, archiving, and distributing scientific data

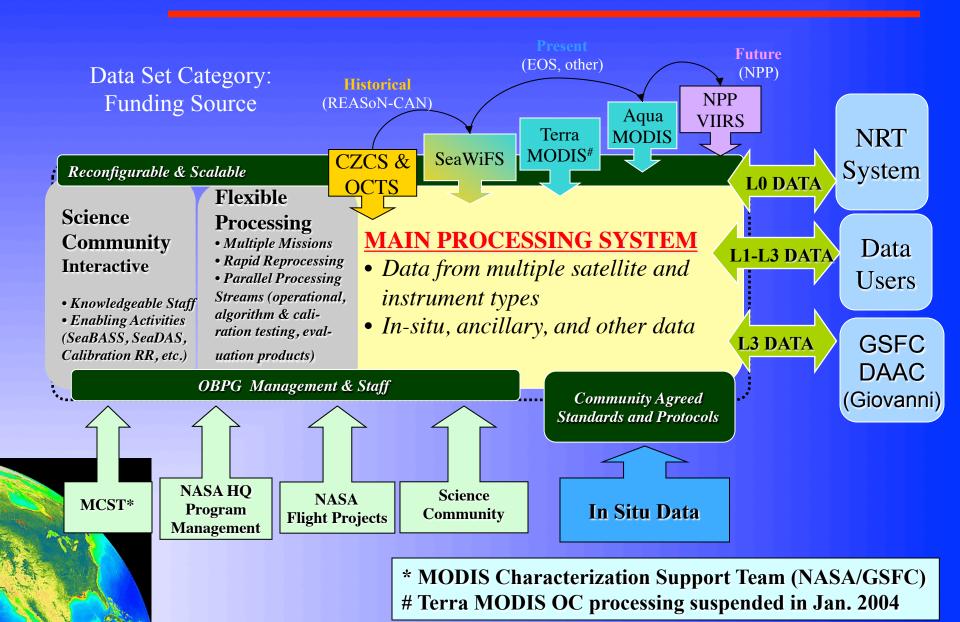
Current system supporting SeaWiFS, MODIS, OCTS, and CZCS.

(Future missions NPP and Aquarius)

Approximately 40 distributed multiprocessor Linux PC's with 100 terabytes of online storage shared by all project components including web/ftp-based data distribution system.

processing rate for SeaWiFS global data currently at 4000x and MODIS/Aqua 200x

Ocean Biology Processing System



Data Products

MODIS Standard Products

Geophysical Parameter Name	Description	Units	Level 2	Level 3
nLw_412	Normalized water-leaving radiance at 412 nm	mW·cm-2·µm-1·sr- 1	Image and product specifics	Data details
nLw 443	Normalized water-leaving radiance at 443 nm	mW·cm-2·µm-1·sr- 1	Image and product specifics	Data details
nLw_488	Normalized water-leaving radiance at 488 nm	mW·cm-2·µm-1·sr- 1	Image and specifics	Data details
nLw_531	Normalized water-leaving radiance at 531 nm	mW·cm-2·µm-1·sr- 1	Image and specifics	Data details
nLw_551	Normalized water-leaving radiance at 551 nm	mW·cm-2·µm-1·sr- 1	Image and specifics	Data details
nLw_667	Normalized water-leaving radiance at 667 nm	mW·cm-2·µm-1·sr- 1	Image and product specifics	Data details
Tau_869	Aerosol optical thickness at 869 nm	dimensionless	Image and product specifics	Data details
Eps_78	Epsilon of aerosol correction at 748 and 869 nm	dimensionless	Image and product specifics	Data details
Chlor_a	OC3 Chlorophyll a concentration	mg·m-3	Image and product specifics	Data details
K490	Diffuse attenuation coefficient at 490nm	m-1	Image and product specifics	Data details
Angstrom_531	Angstrom coefficient, 531-869 nm	dimensionless	Image and product specifics	Data details
SST	Sea Surface Temperature - 11micron	degrees Celsius	Image and product specifics	Data details
SST4	Sea Surface Temperature - 4micron (nighttime	degrees Celsius	See above	Data details

SeaWiFS Standard Products

Geophysical Parameter Name	Description	Units	Level 2	Level 3
nLw_412	Normalized water-leaving radiance at 412 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
nLw 443	Normalized water-leaving radiance at 443 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
nLw_490	Normalized water-leaving radiance at 490 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
nLw_510	Normalized water-leaving radiance at 510 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
nLw_555	Normalized water-leaving radiance at 555 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
nLw_670	Normalized water-leaving radiance at 670 nm	mW·cm-2·µm-1·sr-1	Image and product specifics	Data details
Tau_865	Aerosol optical thickness at 865 nm	dimensionless	Image and product specifics	Data details
Eps_78	Epsilon of aerosol correction at 765 and 865 nm	dimensionless	Image and product specifics	Data details
Chlor_a	OC4 Chlorophyll a concentration	mg·m-3	Image and product specifics	Data details
K490	Diffuse attenuation coefficient at 490nm	m-1	Image and product specifics	Data details
Angstrom_510	Angstrom coefficient, 510-865 nm	dimensionless	Image and product specifics	Data details

Other Products

Geophysical Parameter Name	Description	Units	Details
	Photosynthetically Active Radiation from the sun 400-700 nm	Einstein/m2/day	Product specifics
SeaWiFS NDVI	Normalized Difference Vegetation Index		Browse L3 Imagery
SeaWiFS Land Reflectance	Land Reflectance		Browse L3 Imagery
SeaWiFS Biosphere	Biosphere product		Browse L3 Imagery

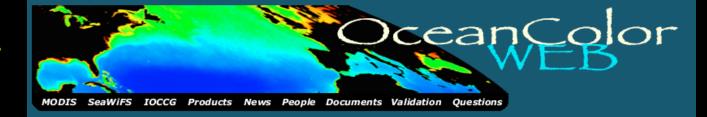
How to get the data

Data Access and Community Support

- Research campaign support global ocean color and sst data available for distribution within 3-4 hours of acquisition by the spacecraft.
- Web/FTP-based data access and distribution web/ftp-based browse and order tool that allows everything from a single file to the entire multi-mission data set to be downloaded.

Ocean Color Web

Consolidated data access, information and services



Data Access

Level 1 and 2 Browser

Visually search the ocean color data archive and directly download and/or order data from single files to the entire mission. Extensive online <u>HELP</u> and tutorials available.

Level 3 Browser

Browse the entire Level 3 global ocean color data set for many parameters and time periods and download either JPEG images or digital data in HDF format. View time series plots of selected SeaWiFS parameters for selected regions of the globe.

Data Subscriptions

Request a subscription for Aqua data to be staged on an <u>FTP</u> site. You can <u>check the status</u> of an existing subscription.

Data by FTP

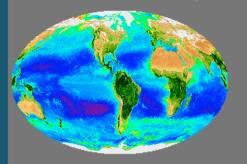
The Project maintains several FTP sites containing the most popular data products including the complete Level 3 data archive.

GES DAAC

The GES DAAC is the official archive for MODIS SST data (Terra and Aqua). They also distribute OCTS and CZCS ocean color data sets.

Ocean Color Web Feature

Recent topics and imagery of interest to the OceanColor community.



An updated animation of the <u>SeaWiFS</u> <u>biosphere data set</u> encompassing eight years worth of ocean color (chlorophyll concentration) and land vegetation (normalized difference vegetation index) observations from September 1997 through July 2005 is now available. Click on the above reduced subset of that animation to learn more.

Image Gallery

NOTE: All SeaViFS images presented here are for research and educational use only. All commercial use of SeaViFS data must be coordinated with ORBIMAGE

Ocean Color Distribution Statistics

Support Services

SeaDAS

A comprehensive image analysis package for the processing, display, analysis, and quality control of ocean color data.

SeaBASS

An archive of in situ data, both oceanographic and atmospheric, used for algorithm development and satellite validation.

Register for Support Services

Register for support services, including:

- SeaWiFS data access authorization
- Access to Near Real Time image support
- Ocean Color Forum
- Ocean Color Mailing List

Support Services

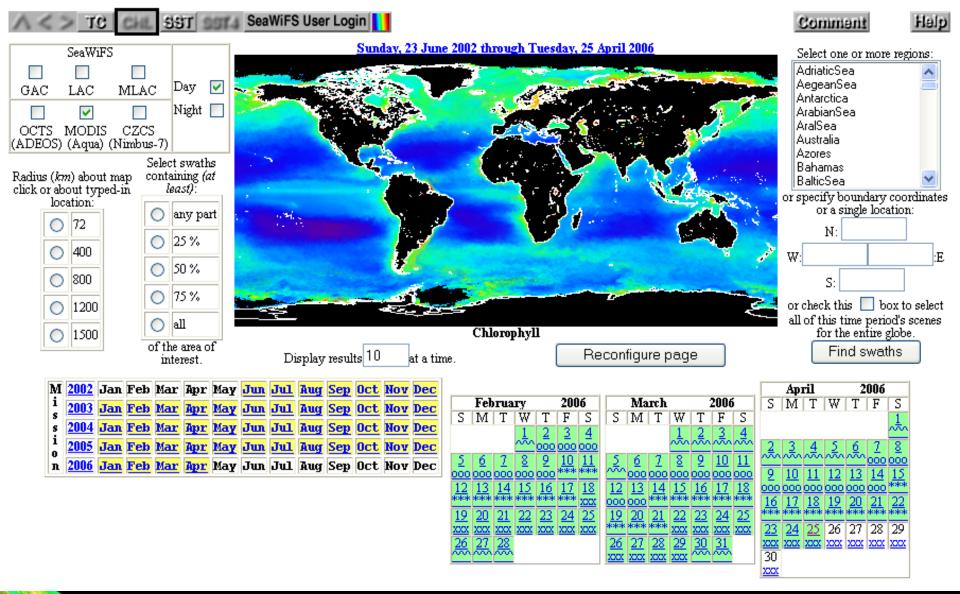
- Overflight predictions
- Near real-time imagery and data for cruise support

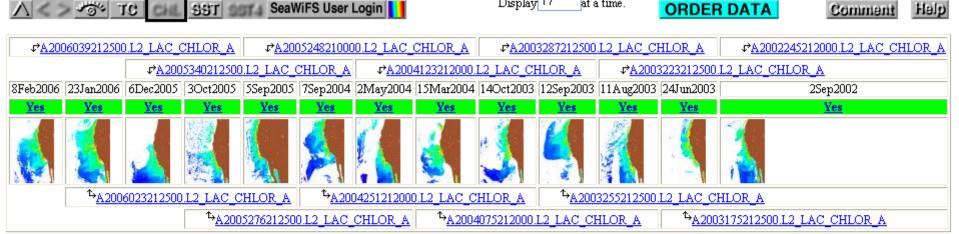
Data Processing

The ODPS site contains information related to the ocean color data production system.

Employment Opportunities (IOCCG listings)

http://oceancolor.gsfc.nasa.gov/





Display 17

at a time.

Search Criteria

Time Period: Entire mission (daytime)

Sensors: MODIS(Aqua)

Area of Interest: Within 800 km of 36.8N,121.8W



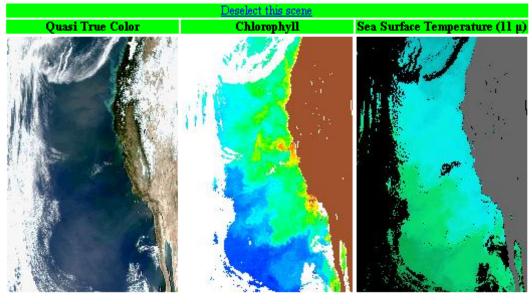
Percentage of AOI that swaths must include: 100

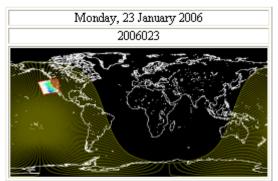
Number of swaths: 1st through 13th of 13 swaths interactively selected from 136 swaths

A2006023212500.L1A LAC A2006023212500.L2 LAC A2006023212500.L2 LAC SST

57,490,056 bytes 23,146,958 bytes 4,803,101 bytes

(The above hyperlinks point to bzip2-compressed HDF files. Documentation on these products can be found HERE.)





Search Criteria

Time Period: Entire mission (daytime)

Sensors: MODIS(Aqua) Area of Interest: Within 800 km of 36.8N,121.8W



Percentage of AOI that swaths must include: 100

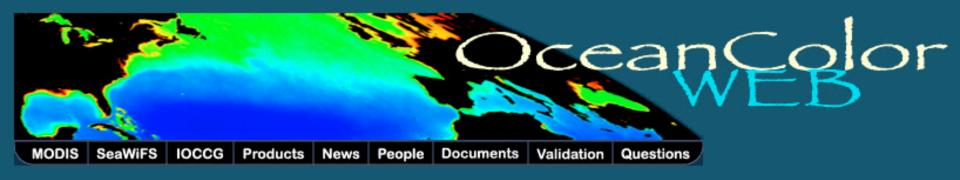
Number of swaths: 2nd of 13 swaths interactively selected from 136 swaths

<u>∧</u> SeaWiFS User Login				C	tnemmo	Help
Inter your email address.						
			No 44.99	rth 5		
In order to reduce the volume of data that you have to deal with, we can extract the geographical area indicated at right from the swaths you ordered before we place the data in our download area. (This extraction currently only applies to SeaWIFS files and MODIS level-2 files.)		228°	234°	240°	246 ⁴	
Please choose one of the following options.				100	100	
Do O Do not O extract my order for me.		42°		* 77	- 12 m	42°
You may adjust the extraction region by altering the coordinates at right.	West					East
The default coordinates are the ones which circumscribe the area or areas of interest that you used to do your search. If you started your search by just clicking on the world map without specifying a larger search radius, then you may want to increase the size of your extract region since the default search radius is 36 kilometers.	-132.67	36°		7.2		36° [-111.96]
All four coordinates are expected to be in decimal degrees. Degrees north of the equator and east of the Greenwich meridian should be positive, and degrees south of the equator and west of the Greenwich meridian should be negative.		228°	234°	240°	246°	
SeaWiFS extracts are processible with <u>SeaDAS</u> .						
			So 28.30	uth O		
Pick which data products you want for your selected scenes. ☐ Level 1						
If you plan to process Level-1 files using <u>SeaDAS</u> , then you will also nee Meteorology & Ozone Attitude & Ephemeris (MODIS only)	ed the following.					
☐ Attitude & Epitemens (MODIS only)						
Level 2						
You may select to receive only the following checked level-2 standard-s then you will receive all of the available level-2 products for a given set chlorophyll a		ish. Jfyou sele	ct none of th	nese and s	imply check	"Level 2" above,
 ■ K490 ■ normalized, water-leaving radiances 						
aerosol products						
□ Level 2 SST (11 μ) (MODIS only) □ Level 2 SST (4 μ) (MODIS nighttime only)						
 ✓ Remind me when my order is about to expire. ✓ Require my email confirmation for early file deletion. 						
▼ Require my email communion for early file deletion. ✓ Notify me when my data have been deleted from the staging area.	http://oce	ancolor.	gsfc.na	sa.go	v/cgi/bro	owse.pl

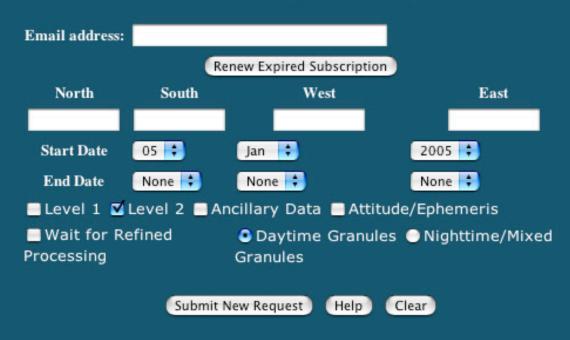
Review order

_		
	Status for Order Id : 3030e01063514742	2 at Mon May 1 10:44:06 2006
Order	ld	3030e01063514742
Email /	Address	norman@seawifs.gsfc.nasa.gov
Base F	File Count	38
Base F	Files Staged Thus Far	4
	Files Currently Staged	4
	Files To Be Staged	34
	nt Staged	10.53%
Files D	eleted	0
Status		Being Staged
1 2	A2006091210000.L1A_LAC A2006092200500.L1A_LAC	CURRENTLY STAGED CURRENTLY STAGED
2 3 4	A2006092214500.L1A_LAC	CURRENTLY STAGED
5	A2006093205000.L1A_LAC A2006094213000.L1A_LAC	CURRENTLY STAGED BEING STAGED
6	A2006095203500.L1A_LAC	PENDING
7	A2006096212000.L1A_LAC	PENDING PENDING
8 9	A2006097202500.L1A_LAC A2006098210500.L1A_LAC	PENDING PENDING
10	A2006098211000.L1A_LAC	PENDING
11	A2006099201000.L1A_LAC	PENDING
Location	on	Your Files Are Located Here
Attem		1
Receiv		May 1 2006 10:43AM
Confir		May 1 2006 10:43AM
Staged		
Notifie		
Expire		
	Requested	
North		
South		0
West		0
East		
	Enabled Optio	ns
Stage	Level 1	√
Stage		
	Metozone	
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	m Delete	
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	t Must Fit leleted mail	
Chloro		
	pnyll urface Temperature (deprecated)	
	urface Temperature (deprecated)	
	urface Temperature 4 Micron	
K490		
radian	ces	
Aeroso	oi	

Status for Order Id : 3	030e01063514742 at Mon May 1 10:48:42 2006
Order Id	3030e01063514742
Email Address	norman@seawifs.gsfc.nasa.gov
Base File Count	38
Base Files Staged Thus Far	38
Base Files Currently Staged	38
Base Files To Be Staged	0
Percent Staged	100.00%
Files Deleted	0
Status	
	Staged & Notified
1 A2006091210000.L1A_LAC 2 A2006092200500.L1A_LAC 3 A2006092214500.L1A_LAC 4 A2006093205000.L1A_LAC 5 A2006094213000.L1A_LAC 6 A2006095203500.L1A_LAC 7 A2006096212000.L1A_LAC 8 A2006097202500.L1A_LAC 9 A2006098210500.L1A_LAC 10 A2006098211000.L1A_LAC 11 A2006099201000.L1A_LAC	CURRENTLY STAGED
Location	Your Files Are Located Here
I AM D	ONE WITH THESE FILES, DELETE THEM
<u> </u>	xtend Expiration Date On This Order
Attempts	1
Received	May 1 2006 10:43AM
Confirmed	May 1 2006 10:43AM
Staged	May 1 2006 10:48AM
Notified	May 1 2006 10:48AM
Expires	May 4 2006 10:48AM
Expire Requested	
North	0
South	0
West	0
East	0
	Enabled Options
Stage Level 1	√
Stage Level 2	
Stage Metozone	
Stage Atteph	
Send Reminder	
Confirm Delete	
Stage Extract	
Extract Must Fit	
Send deleted mail	
Chlorophyll	
Sea Surface Temperature (deprecated)	
Sea Surface Temperature Standard Product	
Sea Surface Temperature 4 Micron	
K490	



Data Subscription Request



Curator: OceanColor Webmaster Authorized by: gene carl feldman Updated: 23 November 2004

Security, Privacy, and Accessibility Policy



Level-3 Standard Mapped Images

<u>View the color</u> <u>Browse the rolling 32-day</u>

Browse the "filled-in" version of the rolling 32-day

Browse the seasonal, monthly, and 8-day climatologies.

scales. composites.

biosphere composites.

Aqua-MODIS	Chlorophyll	Diffuse attenuation	nLw at 551 nm	Aerosol optical thickness	Angstrom coefficient	SST [11 µ day]	SST [11 µ night]	SST [4 µ night]
CanWiEC	<u>Chlorophyll</u>	Diffuse attenuation	nLw at 555 nm	Aerosol optical thickness	Angstrom coefficient			
SeaWiFS	<u>Biosphere</u>	PAR	<u>NDVI</u>	Land Reflectance				
Evaluation Products	Merged Chlorophyll	Fluorescence Line Height						

						Jul 2002	Aug 2002	Sep 2002	Oct 2002	Nov 2002	Dec 2002
Jan 2003	Feb 2003	Mar 2003	Apr 2003	May 2003	Jun 2003	Jul 2003	Aug 2003	Sep 2003	Oct 2003	Nov 2003	Dec 2003
										Nov 2004	
Jan 2005	Feb 2005	Mar 2005	Apr 2005	May 2005	Jun 2005	Jul 2005	Aug 2005	Sep 2005	Oct 200 <mark>5</mark>	Nov 2005	Dec 2005
Jan 2006	Feb 2006	Mar 2006	Apr 2006	May 2006							

Previous

Chlorophyll (Aqua-MODIS)



Next

Yearly	Seasonal	Monthly	Weekly	Daily	3-Day
<u>rearry</u>	Scasonai	Monany	<u></u>	<u> </u>	<u>5-Day</u>
				福。1987、新	ALANA A
				A STATE OF THE STA	White it, display
				AL STATE OF THE ST	
			16Oct2005 to 23Oct2005	23-Oct-2005	21Oct2005 to 23Oct2005
			9km png HDF	9km png HDF	9km png HDF
The second second			4km png HDF	4km png HDF	4km png HDF
2005	Autumn-2005	Oct-2005	20 July 100	Marie There are	Ca Salar de
9km png HDF	9km png HDF	9km png HDF			
4km png HDF	4km png HDF	4km png HDF		The state of the s	
			24Oct2005 to 31Oct2005	24-Oct-2005	22Oct2005 to 24Oct2005
			9km png HDF	9km png HDF	9km png HDF
			4km png HDF	4km png HDF	4km png HDF

FTP Page for Ocean Color Products

http://oceancolor.gsfc.nasa.gov/ftp.html

The tables below provide direct ftp access to data products organized by satellite

(Level 1, Level 2 and Geolocation files are only for the most recent 15 days)

A complete description of the FTP site structure can be found in the <u>README</u> file at the top level of the site (<u>ftp://oceans.gsfc.nasa.gov</u>)

MODIS Aqua

Binned	Mapped	Level 1, GEO, & Level 2	Level 3 Binned Standard Product Suite	<u>Level 3</u> <u>Mapped</u> <u>Standard</u> <u>Product</u> <u>Suite</u>	Quickl Daytir granu Quickl Night/ granu	ne les ook - 'Mixed
<u>Binned</u> Daily	<u>Mapped</u> <u>Daily</u>	Refined - Daytime granules Refined - Night/Mixed	;	SeaWiF	S Le	evel 3
		<u>granules</u>		Binned		Mapped
<u>Binned</u> <u>Daily / 3Day</u> <u>Quicklook</u>	<u>Mapped</u> <u>Daily / 3Day</u> <u>Quicklook</u>			<u>Level 3 Binn</u> <u>Standard Pr</u> <u>Suite and P</u>	roduct	<u>Level 3 Mapped</u> <u>Standard Product</u> <u>Suite and PAR</u>
<u>Binned</u> 8Day	<u>Mapped</u> 8Day			Binned Daily		Mapped Daily
Binned	Mapped			Binned 8 Da	<u> </u>	Mapped 8 Day
<u>Monthly</u>	Monthly			Binned Mon	<u>thly</u>	Mapped Monthly
<u>Binned</u> <u>Monthly</u> Climatology	<u>Mapped</u> <u>Monthly</u> Climatology			Binned Mon Climatology		<u>Mapped Monthly</u> <u>Climatology</u>
Binned	Mapped			Binned Seas	<u>sonal</u>	Mapped Seasonal
<u>Seasonal</u>	<u>Seasonal</u>			Binned Anni	<u>ual</u>	Mapped Annual
<u>Binned</u> <u>Seasonal</u> Climatology	<u>Mapped</u> <u>Seasonal</u> <u>Climatology</u>		:	Merged	Aqı	ıa/SeaWiFS
<u>Binned</u> <u>Annual</u>	<u>Mapped</u> <u>Annual</u>			available as a	a 9km i	<u>:WiFS chlorophyll</u> product i: resolution SMI. The SMI is
Ancillar	y Produ	cts		stored as 16 standard SMI	bit inte I files	ger vs. the 8bit for the

METOZ: NCEP Meteorological (MET) and TOMS/TOAST Ozone (OZ) ancillary data used for L1-L2 processing (updated every 4 hours)

<u>OISST</u>: NOAA Optimum Interpolation (OI) Sea Surface Temperature.These files are used as input for the L1-L2 SST processing

MODISA/ATTEPH: MODIS Aqua definitive attitude and ephemeris data

MODISA/CAL: Updated MODIS Aqua Level 1B LUTs (Look-up tables) and Geolocation files

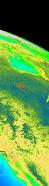
MODIST/CAL: Updated MODIS Terra Level 1B LUTs and Geolocation files

utcpole.dat: Most recent version of the Earth motion file used in Level 1 processing.

<u>leapsec.dat</u>: Most recent version of the Leap seconds file - required for accurate time conversions in Level 1 processing.

SeaWiFS GPS elements (elements.dat)

Global 1 Kilometer Land Mask (landmask.dat) Documentation



Millenium Coral Reefs Landsat Archive

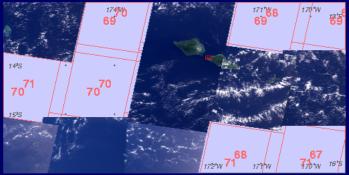
A product of USF Millenium Global Coral Reef Mapping Project / NASA SeaWiFS / NASA Johnson Space Center Project Overview >>

Available Data

Click on any of the tiles in the map at left to reposition the tile mosaic below.

The open yellow rectangle on the map at left indicates the position of the currently displayed tile mosaic.

A headerless version of this page can save you the use of the vertical scrollbars if you have a large enough display.



Tile Mosaic

			١
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4		Þ	
	~		

Click anywhere in the tile mosaic at left to reposition the mosaic and to reposition the detailed view below. Alternatively, you can use the arrows to reposition the mosaic.

The open red rectangle on the mosaic indicates the position of the detailed view.

Detailed View (30-meter resolution)

Mission: Landsat 7 Path: 69 Row: 70

Date: 6 Jul 1999 FTP access

Go to Millenium Coral Reef Map Status for this

provided.

Path-Row

Quasi-natural color displayed. Switch to reef-enhanced view.

Click anywhere in the image at left to choose a new center, or use the arrows to pan around this scene. If this path/row was acquired more than once, then the date label above becomes a hyperlink that allows you to change to other dates. FTP access to all of the data for this

path/row/date combination is also



How to work with the data

SeaDAS Web

Support

SeaDAS Forum

Ocean Color Forum

Ocean Color Web

Ocean Mailing Lists

Download and Installation

We have a new simplified online installation process. Or, you can manually download SeaDAS, and follow the installation instructions.

Satellite Data

Data Product Specifications
Processing Versions Chart
Level 1 and 2 Browser
Level 3 Browser
Data by FTP

Ancillary Data

MET/OZONE INFO
NOAA OISST INFO
Aqua ATTEPH INFO
Terra ATTEPH INFO
utcpole.dat INFO
leapsec.dat INFO
elements.dat INFO

What is SeaDAS

The SeaWiFS Data Analysis System (SeaDAS) is a comprehensive image analysis package for the processing, display, analysis, and quality control of ocean color data.



Supported satellite sensors are MODIS, SeaWiFS, CZCS, OCTS, MOS, OSMI, and AVHRR.

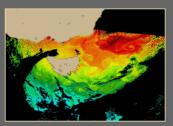
- Features
- <u>Requirements</u>
- Online Help
- Known Problems
- O History of Events
- References

SeaDAS 4.8 Distribution Statistics
SeaDAS 4.7 Distribution Statistics
SeaDAS Software Usage Policy
seadas@seadas.gsfc.nasa.gov

What's New

SeaDAS 4.9 released

- CentOS 4.2 & Fedora Core 4 support
- O Improved SST processing (msl12 5.4)
- O Full SST display support including SST quality levels display
- O New processing binaries including l2bin, l3bin, and smigen
- O Better mechanism for shared installs



MODIS Aqua Nighttime 4μ SST Product

MODISL1DB 1.2

MODISL1DB is for Direct Broadcast users, containing only the portions of SeaDAS for processing MODIS Aqua and Terra L0 data to L1A and L1B.

We now have 4 SeaDAS mirrors
helping us to distribute SeaDAS 4.8.
The OBPG would like to thank those
who have so kindly donated their
resources. THANK YOU!!!

http://oceancolor.gsfc.nasa.gov/seadas/

Ocean Color Forum

Ocean Color Forum - Not logged in

Forum OceanColor Home Help Search Register Login

Forum

Feeds Info

■ SeaDAS News

■ SeaDAS FAQ

□ Ocean Color	Posts	Last Post
OceanColor Announcement	42	2005-08-19 09:38
News and topics of general interest		
■ Algorithms and Products	Posts	Last Post
■ Frequently Asked Questions	23	2005-10-25 14:24
■ Satellite Data Products & Algorithms	561	2005-11-30 16:42
■ Satellite Data Access	444	2005-11-30 11:05
■ Field Data	14	2005-09-12 14:27
SeaBASS, in situ data access, and collection protocols		
Mission Events	2	2004-04-23 12:17
Spacecraft-related events		
■ SeaDAS	Posts	Last Post

16

13

5

20

1203

Curator: OceanColor Webmaster Authorized by: gene carl feldman Updated: 20 October 2005

■ SeaDAS: General Questions

■ SeaDAS: Known Problems and Fixes

■ MODIS Direct Broadcast Support



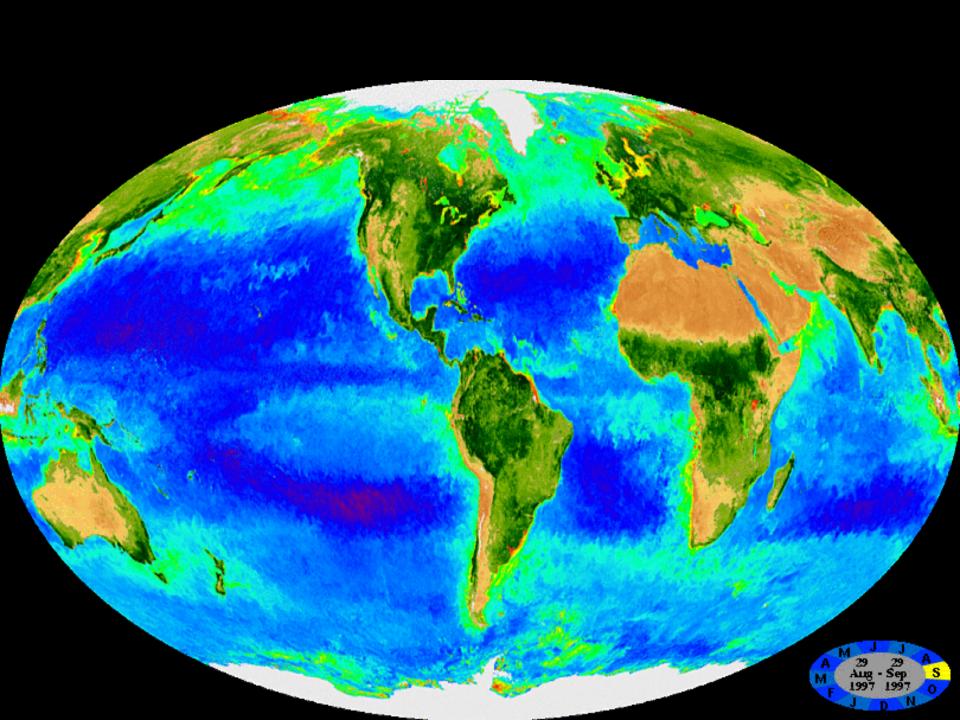
2005-11-18 11:24

2005-11-17 10:38

2005-11-01 16:25

2005-11-30 20:40

2005-11-18 18:50



Questions?